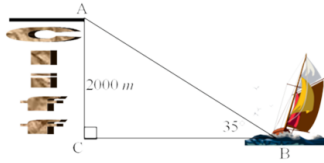


A sailboat is approaching a cliff. The angle of elevation from the sailboat to the top of the cliff is 35° . The height of the cliff is known to be about 2000 m. How far is the sailboat away from the base of the cliff?



Dec 16-7:37 AM

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SOH CAH TOA

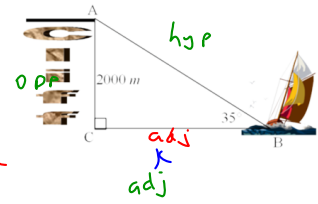
$$\tan 35^\circ = \frac{o}{a}$$

$$\tan 35^\circ = \left(\frac{2000}{x} \right)$$

$$x = \frac{2000}{\tan 35^\circ}$$

$$x = \frac{2000}{(0.7002)}$$

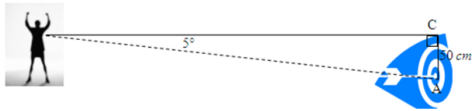
$$x = 2856.3$$



The sailboat is 2856.3 m from the base of the cliff.

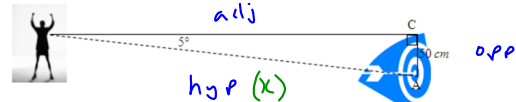
Dec 16-7:37 AM

2. An archer shoots and gets a bulls-eye on the target. From the archer's eye level the angle of depression to the bulls-eye is 5° . The arrow is in the target 50 cm below the archer's eye level. Calculate the distance the arrow flew to hit the target (the dotted line).



Dec 16-7:38 AM

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SOH CAH TOA

$$\sin 5^\circ = \left(\frac{50}{x} \right)$$

$$x = \frac{50}{\sin 5^\circ}$$

$$x = \frac{50}{(0.0872)}$$

$$x = 573.4$$

The arrow flew 573.4 cm to the bulls-eye.

Dec 16-7:38 AM

4. The foot (bottom) of a ladder is placed 1.5 m from a wall. The ladder makes a 70° angle with the level ground. Find the length of the ladder. (Round to one decimal place.)



SOH CAH TOA

$$\cos 70^\circ = \frac{1.5}{x}$$

$$x = \frac{1.5}{\cos 70^\circ}$$

$$x = \frac{1.5}{0.3420}$$

$$x = 4.4$$

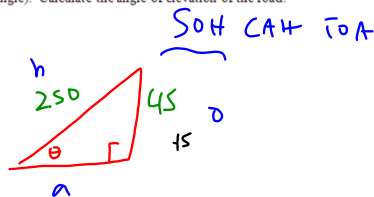
The ladder is 4.4 m long.

Dec 16-7:41 AM

Dec 16-7:41 AM

A construction engineer determines that a straight road must rise vertically 45 m over a 250 m distance measured along the surface of the road (this represents the hypotenuse of the right triangle). Calculate the angle of elevation of the road.

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$$\sin \theta = \frac{45}{250}$$

$$\sin \theta = 0.1800$$

$$\theta = \sin^{-1}(0.1800)$$

$$\theta = 10^\circ$$

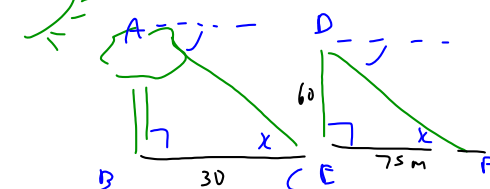
The angle of elevation of the road is 10° .

Dec 16-7:41 AM

Dec 16-7:41 AM

Example 1: A tree casts a shadow of 30m at the same time a television antenna casts a shadow of 75m. If the antenna is 60m high, how tall is the tree?

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$$\angle B = \angle E \quad (90^\circ)$$

$$\angle C = \angle F \quad (\text{angle of elevation})$$

$$\triangle ABC \sim \triangle DEF \quad (AA)$$

SAS
SSS

$$\frac{75}{30} = \frac{60}{x}$$

$$75x = (30)(60)$$

$$x = \frac{30(60)}{75}$$

$$x = \frac{1800}{75} = 24$$

The tree is 24m tall.

Dec 16-7:42 AM

Dec 16-7:42 AM

Homework

p. 412 q. 1,3,5,8,11

May 28-7:14 AM